

Influence of *Yucca shidigera* extract on ruminal ammonia concentrations and ruminal microorganisms.

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An extract of the desert plant *Yucca shidigera* was assessed for its possible benefit in ruminal fermentation. The extract bound ammonia in aqueous solution when concentrations of ammonia were low (up to 0.4 mM) and when the extract was added at a high concentration to the sample (20%, vol/vol). The apparent ammonia-binding capability was retained after autoclaving and was decreased slightly following dialysis. Acid-precipitated extract was inactive. No evidence of substantial ammonia binding was found at higher ammonia concentrations (up to 30 mM). When *Y. shidigera* extract (1%, vol/vol) was added to strained rumen fluid in vitro, a small (6%) but significant ($P < 0.05$) decrease in ammonia concentration occurred, apparently because of decreased proteolysis. Inclusion of *Y. shidigera* extract (1%, vol/vol) in the growth medium of the rumen bacterium *Streptococcus bovis* ES1 extended its lag phase, while growth of *Butyrivibrio fibrisolvens* SH13 was abolished. The growth of *Prevotella* (Bacteroides) *ruminicola* B(1)4 was stimulated, and that of *Selenomonas ruminantium* Z108 was unaffected. Protozoal activity, as measured by the breakdown of ¹⁴C-leucine-labelled *S. ruminantium* in rumen fluid incubated in vitro, was abolished by the addition of 1% extract. The antimicrobial activities were unaffected by precipitating tannins with polyvinylpyrrolidone, but a butanol extract, containing the saponin fraction, retained its antibacterial and antiprotozoal effects. Saponins from other sources were less effective against protozoa than *Y. shidigera* saponins. *Y. shidigera* extract, therefore, appears unlikely to influence ammonia concentration in the rumen directly, but its saponins have antimicrobial properties, particularly in suppressing ciliate protozoa, which may prove beneficial to ruminal fermentation and may lead indirectly to lower ruminal ammonia concentrations.

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